

Re-turning matters of body_mind: Articulations of ill-/health and energy/fatigue gathered through vocational and health education

Geert Thyssen^{a*} and Frederik Herman^b

^a *School of Education, Liverpool John Moores University, campus I.M. Marsh, Liverpool, United Kingdom*

^b *School of Education, University of Applied Sciences and Arts Northwestern Switzerland, campus Solothurn, Switzerland*

Geert Thyssen is Senior Lecturer at Liverpool John Moores University. His interests are in the social and cultural history of education, with a focus on educational reform, health education, bodily and sensory education, nutritional education, and modes and aspects of meaning-making in education broadly conceived. He is convenor of Network 17 – Histories of Education of the European Educational Research Association, and member of the scientific boards of the journals *Rivista di Storia dell'Educazione* and *Espacio, Tiempo y Educación*. So far he has been successfully awarded external funding for Transforming Bodies: Health and Education in Luxembourg's Schools (c. 1840-1920) (FNR), a research project integrated into Fabricating Modern Societies: Industries of Reform as Educational Responses to Societal Challenges, ca. 1880-1930, Part 1 and 2), likewise successfully awarded funding (FNR) and co-designed and initially co-coordinated with Assoc. Prof. Karin Priem. Together with Assoc. Prof. Fabio Pruneri he leads the externally funded research project Looking back Going forward: School_Time in Flux and Flow in Europe and Beyond (EERA, UNISS, Stichting Paedagogica Historica), and together with Prof. Ian Grosvenor co-edits a special issue forthcoming in *The Senses and Society*.

Frederik Herman specialises in social and cultural history of education, with a strong emphasis on histories of educational mentalities and realities and on socio-cultural/material practices. He joined the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) on 1 March 2018. He studied Educational Sciences at the Ghent University, where he graduated in 2006. He completed his doctorate on “20th century school culture” at the University of Leuven in 2010. After spending two years as lecturer and coordinator at two teacher training colleges, he joined the University of Luxembourg as a postdoctoral researcher in 2013. At the Institute of Education and Society (InES) and, later onwards, at the Luxembourg Centre for Contemporary and Digital History (C²DH), he has been involved in the FNR-funded project “Fabricating Modern Societies: Industries of Reform as Educational Responses to Societal Challenges (ca.1880-1930)” (FAMOSO) (PI Assoc. Prof. Karin

Priem). His publications have dealt with topics such as materialities of schooling; psychophysiology, professional orientation, and vocational training; cultural learning, heritage making, and identity construction.

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This paper explores “articulations” or “re-turnings” of ill-/health and energy/fatigue in education, re/configuring bodies and minds as “body_minds”. The *Institut Émile Metz* (IEM), founded as a vocational school in 1913, thereby serves as a starting point. This institute is analysed “diffractively” through health education institutes which, together with the IEM, belong to a broader architecture of Luxembourg industry-related social welfare provisions with a global dimension. From knowledge and praxis “gathered” through the IEM, tuberculosis, an infectious disease known to manifest itself in bodily and mental fatigue, emerges as a conspicuous silence. Based particularly on six stills from a corporate film featuring the IEM and a preventorium-sanatorium and open-air school alongside other health education provisions, we trace similar articulations around tuberculosis and (energy/)/fatigue across such institutes. Whereas previous research in this context has pointed to new encounters of bodies and machines, our paper reframes articulations pertaining to such newly imagined “body_machines” as having allowed also for re/configurings of the interrelation between (machine) bodies and minds re/configured as “body_minds”.

Keywords: psychotechnics, gymnastics, hygiene; energy, fatigue, health and infection; vocational and health education; visual performances and re-turnings

Introduction

This paper centres on energy and fatigue and health and ill-health in education in relation to bodies and minds. It aims to analyse across interconnected vocational and health education institutes underexplored articulations around energy/fatigue and tuberculosis (TB), a major threat to children’s and young people’s health around the late nineteenth and early twentieth century. Our paper investigates particular ways in which concerns of inoculation, contagion, energy and fatigue have become entangled across distinct yet related education contexts. We thereby explore the opportuneness of re/configuring bodies and minds as “body_minds” in relation to articulations around or particular entanglements of ill-/health and energy/fatigue discerned. Concretely, our exploration starts from the *Institut Émile Metz* (IEM), founded in

1913 in Dommeldange, Luxembourg as a private institute for vocational training, professional orientation, and adult education.¹ A “psycho-physiological culture” characterised this institute in that it scrutinised and trained pupils’ minds and bodies viewed not as separate from each other but as mutually constitutive and in need of strengthening and harmonisation.² The IEM is analysed through different yet interconnected Luxembourg education institutes, specifically the “open-air school” of Dudelange (founded in 1913) and its Esch-sur-Alzette equivalent (1928) as well as the “preventorium-sanatorium” of Kreuzberg (*Maison des Enfants*, 1920). Our focus is particularly on the period between the 1910s and 1940s. From this context, we explore to what extent entangled articulations discerned around health/infectious disease and energy/fatigue as matters of the human and social “organism” or “machine”³ require a re/configuring of bodies and minds as “body_minds” worth paying attention to in education as much as to “body_machines”.⁴

Industry-related social welfare provisions

The IEM, like the open-air schools of Dudelange and Esch-sur-Alzette and the Kreuzberg

¹ Frederik Herman, ‘Forging Harmony in the Social Organism: Industry and the Power of Psychometric Techniques’, *History of Education* 43, no. 5 (2014): 592-614.

² In this sense the IEM’s praxis aligns clearly with contemporary knowledge articulated, among other places, in the practical bodymind philosophy adopted by the psychologist Fritz Giese in *Körperseele: Gedanken über persönliche Gestaltung* (München: Delphin-Verlag, 1927).

³ Anson Rabinbach, *The Human Motor: Energy, Fatigue and the Origins of Modernity* (Berkeley: University of California Press, 1992). Michaela Vieser, *Das Zeitalter der Maschinen: Von der Industrialisierung des Lebens* [The Machine Age: On the Industrialisation of Life] (Berlin: Braus, 2014); Käte Meyer-Drawe, “Maschine,” in *Vom Menschen: Handbuch Historische Anthropologie* [Of People: Handbook Historical Anthropology], ed. Christoph Wulf (Weinheim: Beltz, 1997), 726-37; Ibid., *Menschen im Spiegel ihrer Maschinen* [People in the Mirror of Their Machines] (Munich: Fink, 1996).

⁴ Frederik Herman, Karin Priem and Geert Thyssen, ‘Body_Machine? Encounters of the Human and the Mechanical in Education, Industry and Science’, *History of Education* 46, no.1 (2017): 108-27; Stephen Petrina, “Postliterate Machineries,” in *New Frontiers in Technological Literacy Breaking with the Past*, ed. John R. Dakers (New York, NJ: Palgrave Macmillan, 2014), pp. 29-43; Laurence Guignard, Pascal Raggi, and Etienne Thévenin, eds., *Corps et machines à l’âge industriel* [Bodies and Machines in the Industrial Age] (Rennes: Presses Universitaires de Rennes, 2011); Jacques Gleyse, et al., ‘Physical Education as a Subject in France (School Curriculum, Policies and Discourse): The Body and the Metaphors of the Engine - Elements Used in the Analysis of a Power and Control System during the Second Industrial Revolution’, *Sport, Education and Society* 7, no. 1 (2002): 5-23.

preventorium-sanatorium, fits in with a broader architecture of Luxembourg social welfare provisions. These provisions came to complement an institutional apparatus concerned with the health of the population that had emerged in the nineteenth century. Thus, for instance, there existed the Medical College (MC) founded in 1818 and later brought under the Ministry of Public Health and Welfare. From around the 1880s onwards the MC, like most hygiene-oriented entities internationally,⁵ moved its focus from environments to inter-human relations as key factors in the transmission of diseases. Possibly as a result of the discoveries of Louis Pasteur and Robert Koch, by the mid-1880s the MC brought forth an unofficial laboratory, which in 1897 became the Practical Laboratory of Bacteriology. In connection with this laboratory, around 1900 the MC started to conduct surveys on the social behaviour and interrelations of workers in their everyday environments.⁶ Similar initiatives, if focused specifically on women and children, originated from private philanthropic entities, such as the Association for Women's Interests (1906) and the Luxembourg League for Social and School Hygiene (1904).⁷ Out of these two bodies, and in close contact with them, developed the Luxembourg League against Tuberculosis (1908), which heavily relied on support from industrialists and affiliated networks for organising campaigns and establishing “dispensaries”, among other provisions.⁸ Such provisions and bodies further expanded the

⁵ Liebeth Nys et al. (eds.), *De zieke natie: Over de medicalisering van de samenleving* [The Sick Nation: On the Medicalisation of Society], 1860-1914 (Groningen: Historische Uitgeverij, 2002); Jürgen Osterhammel, *Die Verwandlung der Welt: Eine Geschichte des 19. Jahrhunderts* [The World's Transformation: A History of the 1800s] (Munich: Beck, 2009).

⁶ [Collège Médical,] *La situation sanitaire du Grand-Duché de Luxembourg: Rapports du Collège Médical et des médecins-inspecteurs pendant l'année 1904* (Luxembourg: Bück, 1905).

⁷ [Association for Women's Interest and League for Social and School Hygiene,] *Einiges über Wohnungsverhältnisse der ärmeren Arbeiterbevölkerung in Luxemburg, zusammengestellt vom Vorstand des Vereines für die Interessen der Frau und hrsg. in Verbindung mit dem Verein für Volks- und Schulhygiene* (Luxembourg: Huss, 1907).

⁸ Marco Hoffmann, *Le développement du travail social au Luxembourg à travers l'activité centenaire de la Ligue médico-sociale* [The Development of Social Work in Luxembourg through a Hundred Years of Activity on the Part of the Medical-Social League] (Luxembourg: Ligue luxembourgeoise de Prévention et d'Action Médico-Sociales, 2008), 9; Simone Kieffer, ‘Les œuvres sociales de l'ARBED (1900-1930) [ARBED's Social Welfare Provisions (1900-1930)]’ (unpublished master's thesis, Marc Bloch University, 2003), 60-1.

existing social welfare architecture.

Industrialists, apart from supporting private philanthropic bodies, set up social welfare provisions of their own, particularly with a view to workers – internationally considered both endangered and dangerous.⁹ They thus aimed to address the “social question”, which by the late nineteenth century emerged across the West following rapidly increased industrialisation, urbanisation and migration.¹⁰ Rather than about workplace organisation and other practical issues, this was about countering threats inherent to such broader processes. In Luxembourg, these threats were seen to present themselves in various forms, be it exposure to unhealthy working and living conditions,¹¹ an alleged ‘invasion of infectious diseases’ linked to the perception of Luxembourg as a ‘crossroads of human circulation’¹², or susceptibility to “social plagues” including “moral anarchy” (read: socialism and communism).¹³ Any such threats could harm productivity and economic stability.¹⁴ It is therefore no surprise that in Luxembourg key protagonists from the steel and mining industries and members of associated networks were soon at the forefront in terms of social welfare provisions.

⁹ Karel Velle, *Lichaam en hygiëne: Naar de wortels van de huidige gezondheidscultuur* [Body and Hygiene: To the Roots of the Present Health Culture] (Gent: MIAT & Kritak, 1984), 18, 22.

¹⁰ See, for England, Carl Chinn, *Poverty amidst Prosperity: The Urban poor in England, 1834-1914* (Lancaster: Carnegie, 2006), and for Continental Europe and North America: Clemens Zimmermann (ed.), *Industrial Cities: History and Future* (Frankfurt: Campus, 2013).

¹¹ Marcelin, ‘La Tuberculose’, *L’Indépendance Luxembourgeoise*, 17 August 1908, 1; Nikolas Heirens, *Die Escher Waldschule als Kindertagesheim. Separatabdruck aus der “Luxemburger Zeitung”* (Luxembourg: Schwell, 1930), 5.

¹² Aline Mayrisch, *Rapport sur l’état actuel de la question de la tuberculose dans le Grand-Duché et sur les meilleures méthodes à suivre pour la résoudre* (Luxembourg: Société de la Croix-Rouge Luxembourgeoise, 1928), 9. The authors thank Enric Novella for this reference. See also “La situation sanitaire dans le Grand-Duché de Luxembourg II,” *L’Indépendance Luxembourgeoise*, 2 December 1929, 1, and for similar articulations in North America: Alan M. Kraut, *Silent Travellers: Germs, Genes and the “Immigrant Menace”* (New York: Basic Books, 1994).

¹³ ARBED, *Œuvres sociales*, 41.

¹⁴ TB in particular was accompanied by high social costs and, therefore, one had to be combat it at any price. Auguste Praum, “Proposition de loi concernant la création d’un sanatorium dans le Grand-Duché. Avis de M. le Directeur du laboratoire de bactériologie”, Archives Nationales de Luxembourg (henceforth ANL), file CdD-2745 (Unpublished legislative proposal, 1907).

The provisions, exemplary of ‘experiments in factory paternalism’ emerging all over Europe and beyond,¹⁵ of course aimed at more than just “betterment”. In Luxembourg, as elsewhere, they also advanced particular “senses of belonging”, not to mention corporate loyalty and various socio-political strategies.¹⁶ The specific institutes investigated here were all connected to a steel concern with a global dimension called ARBED (*Aciéries Réunies de Burbach-Eich-Dudelange*) and its subsidiary companies, particularly those of *Terres Rouges*. ARBED was born in 1911 from the merging of several mining and steel producing companies. One such company had been connected to the industrialist Émile Metz in dedication of whom, in the early 1910s, his then widow Edmée Tesch commissioned the IEM in Dommeldange.

Whereas the Dudelange open-air school, like its Esch counterpart and the Kreuzberg preventorium-sanatorium, was to recruit from “sickly and meagre” children deemed at risk of, or suffering from, ‘heart conditions, lung diseases, scrofulosis, anemia and malnutrition,’ sometimes ascribed to a ‘hereditary predisposition’,¹⁷ the IEM from its inception aimed at the creation of a wholesome trained, male (and, so it seems, in large measure “autochthonous”) steelworkers’ elite.¹⁸ The vocational institute aspired to educate pupils so that they would

¹⁵ See, e.g., Eric J. Evans, *The Shaping of Modern Britain: Identity, Industry and Empire, 1780-1914* (Harlow: Pearson Education, 2011), 249.

¹⁶ Kieffer, ‘Les œuvres sociales’; Antoinette Lorang, *L’image sociale de l’ARBED à travers les collections du Fonds de Logement* [The Social Image of ARBED throughout the Collections of the Fonds de Logement] (Luxembourg: Fonds pour le Développement du Logement, 2009); Geert Thyssen, ‘Engineered Communities? Industry, Open-Air Schools, and Imaginaries of Belonging (c. 1913-1963)’, *History of Education & Children’s Literature* 10, no. 2 (2015): 297-320; Irma Hadzalic, ‘Sick and Weak But Made of Steel: Luxembourgian Open-Air Schools and Other Responses to the Spread of Tuberculosis at the Beginning of the 20th Century’, *Revista de História e Historiografia da Educação* 1, no. 1 (2017): 44-64; Enric Novella, ‘Tuberculosis and Political Economy: Industrial Wealth and National Health in the Grand Duchy of Luxembourg, c. 1900-1940’, *Social History of Medicine* 31, no. 2 (2018): 308-327; Karin Priem and Frederik Herman, eds., *Fabricating Modern Societies: Education, Body and Mind in the “Age of Steel”* (Leiden: Brill, forthcoming 2019).

¹⁷ Johann Ewert and Albert Urbany, *Die Waldschule der Stadt Düdelingen, gegründet 1913 durch die vereinigten Hüttenwerke Arbed, Abteilung Düdelingen: Einrichtung und Organisation im ersten Jahre ihres Bestehens* (Luxembourg: Soupert, [1914]), 21, 25.

¹⁸ Jean Marx, ‘ARBED, A Pioneer of Professional Training in Luxembourg’, in *Steelmaking in Luxembourg: A Century of History and Innovation*, ed. ArcelorMittal (Luxembourg: ArcelorMittal, 2011), 161-3, p. 161; Martine Nies-Berchem, ‘IEM-LTPEM (1914-1989)’, in *Institut Émile Metz -*

come to embody knowledge and skills relevant for particular professions. Rather than being associated with then state-of-the-art health provision, the IEM was presented in ARBED's corporate communications as an exemplary type of provision in its own right, operating *in vitro* – that is: in sterile, disease-free conditions – alongside existing health and rehabilitation initiatives.

In a broader exploration we were compelled to note the following. In primary sources, energy/fatigue, ill-/health and related issues (movement, food etc.) occasionally were indeed mentioned together, for instance by hygienists and proponents of experimental pedagogy.¹⁹ Some even argued that such matters were best studied together within an integral theory or science.²⁰ Still, our review revealed that diseases like TB only featured marginally across such fields as experimental pedagogy or psychotechnology – a picture confirmed by others, albeit implicitly.²¹ This is curious given that by the early 1900s industrial pollution and 'muscular' and 'nervous and mental' fatigue were commonly linked to sickening of the body, seen as a 'finely-adjusted physiological instrument'.²² Fatigue, one thought, made the body 'cultivate pathogenic germs'.²³ It is surprising also given associations made since times

Lycée Technique Privé Émile Metz [Private Technical Gymnasium Émile Metz](1914-1989), ed. Lycée Technique Privé Émile Metz (Luxembourg: Saint-Paul, 1989), 51-65: 53.

¹⁹ Thus, physical and intellectual overwork, worry and chagrin, inadequate diet, polluted air, and above all alcohol abuse we thought to prepare the nursery for tuberculosis. See Albert Langelez, *Notions d'hygiène générale. Applications à l'hygiène scolaire et à l'inspection médicale des écoles. Soins aux malades et blessés* (Luttre: Balsacq-Tilmant, 1916), 372-3.

²⁰ Jules Mardochée Amar (1879-1935) in Joan Tumblety, *Remaking the Male Body: Masculinity and the Use of Physical Culture in Interwar and Vichy France* (Oxford: Oxford University Press, 2012), 50.

²¹ Marc Depaepe: *Zum Wohl des Kindes? Pädologie, pädagogische Psychologie und experimentelle Pädagogik in Europa und den USA, 1890 bis 1914* [To the Health of the Child? Paedology, Psychopedagogy and Experimental Pedagogy in Europe and the USA, 1890-1914] (Weinheim: Deutscher Studien Verlag, 1993); Dimitris Anastasiou, Sophia Iliadou-Tachou and Antonia Harisi, 'The Influence of the School Hygiene and Paedology Movement on the Early Development of Special Education in Greece, 1900-1940: The Leading Role of Emmanouel Lambadarios', *History of Education* 44, no. 4 (2015): 437-59; Andy Byford, 'The Imperfect Child in Early Twentieth-Century Russia', *History of Education* 46, no. 5 (2017): 595-617; Herman, 'Forging Harmony'.

²² Alfred B. Brown, *The Machine and the Worker* (London: Nicholson and Watson, 1934), 51, 71, 80.

²³ Jules Amar, 'Effets physiologiques du travail et "degré de fatigue"', *C.r. académies des sciences* 157, (1913) 646-9.

immemorial of TB with consumption of the body, wasting away of strength and appetite, melancholy etc., in short: a general disturbance of health, energy balance and labour productivity.²⁴

Likewise, in secondary sources, developing or aspiring disciplines like bacteriology, hygiene, and labour sciences, which provided legitimation to the IEM and affiliated health education initiatives, have so far mostly been focused on separately. Thus, in anthropologies and medical histories tracing the emergence, metamorphosis, spread and reception of “germ theory”, social and school hygiene, or responses to TB in particular, links to energy/fatigue have been cursory at best.²⁵ This applies also to educational histories of mental hygiene that have exposed the psycho-medical and -biological underpinnings of current educational sub-disciplines of a “therapeutic” signature.²⁶ Conversely, histories of labour sciences and work hygiene and fatigue studies have thus far made but casual links, if any, to diseases like TB.²⁷ Of course, a wealth of studies has been produced in the past decades on gymnastics, physical and sport education, health and schooling more generally, and school medical inspection and

²⁴ René J. Dubos and Jean Dubos, *The White Plague: Tuberculosis, Man, and Society* (New Brunswick, NJ: Rutgers University Press, 1987); Bryder, *Below the Magic Mountain*; Francis B. Smith, *The Retreat of Tuberculosis, 1850-1950* (London: Croom Helm, 1988); Sheila M. Rothman, *Living in the Shadow of Death: Tuberculosis and the Social Experience of Illness in American History* (New York: HarperCollins, 1994); Walter Vandereycken and Ron Van Deth, *From Fasting Saints to Anorexic Girls: The History of Self-Starvation* (London: Athlone, 1994). See also: Tumblety, *Remaking the Male Body*, esp. 3, 40.

²⁵ On scientific and vernacular moving and morphing of germ theory, see, e.g., Bruno Latour, *The Pasteurization of France* (Cambridge, MA: Harvard University Press, 1988); Nancy Tomes, *The Gospel of Germs: Men, Women, and the Microbe in American Life* (Cambridge, MA: Harvard University Press, 1999). On various, cross-disciplinary institutional responses to TB, see e.g., Linda Bryder, *Below the Magic Mountain: A Social History of Tuberculosis in Twentieth Century Britain* (Oxford: Oxford University Press, 1988); Cynthia A. Connolly, ‘Pale, Poor, and “Pretubercular” Children: A History of Pediatric Antituberculosis Efforts in France, Germany, and the United States, 1899-1929’, *Nursing Inquiry* 11 (2004): 138-147; Ibid., *Saving Sickly Children: The Tuberculosis Preventorium in American Life, 1909-1970* (London: Rutgers University Press, 2008).

²⁶ Sol Cohen, *Challenging Orthodoxies: Toward a New Cultural History of Education* (New York: Peter Lang, 1999).

²⁷ Raf De Bont, ‘Energie op de weegschaal: Vermoeidheidsstudie, psychotechniek en biometrie in België [Energy on the Balance: Fatigue Studies, Psychotechnics, and Biometrics in Belgium] (1900-1945)’, *Belgisch Tijdschrift voor Nieuwste Geschiedenis* 32, no. 1-2 (2002) 23-71; Rabinbach, *Human Motor*.

other specific sectors. Convergence of energy and infection theories may thereby be assumed yet this has not often been reflected upon explicitly.²⁸ Similarly, there are studies on various energy- and fatigue-related “conditions” in education contexts, but here too, links to TB are scarce.²⁹

From the context of vocational schooling, then, here centred on in particular, infectious disease emerges as a conspicuous silence. As regards the IEM, this silence is even more curious, as the institute drew explicitly from such fields as fatigue studies, closely related to psychotechnics,³⁰ as well as from hygiene and gymnastics. Indeed, the renowned Paris physiologist, fatigue expert and work scientist, Jules Mardochée Amar provided concrete inspiration. Although Amar never worked at the IEM, the institute utilised and further developed his innovative scientific testing and training approaches and equipment.

²⁸ On physical education, sport and school medical inspection, a reference work remains David Kirk, *Schooling Bodies: School Practice and Public Discourse, 1880-1950* (London: Leicester University Press, 1998). On (gendered) bodies, gymnastics and sport, see also studies by Ann Chisholm and in relation to schooling, e.g., John Welshman, ‘Physical Culture and Sport in Schools in England and Wales 1900-40’, *International Journal of the History of Sport* 15 (1998): 54-75; Ibid., “Child Health, National Fitness, and Physical Education in Britain, 1900- 1940.” In Marijke Gijswijt-Hofsta and Hilary Marland, *Cultures of Child Health in Britain and the Netherlands in the Twentieth Century* (Amsterdam: Rodopi, 2003), 61-84. Cases in point in terms of energy and fatigue being touched on in relation to physical culture yet not linked to disease/TB are the following works: Mark Freeman (ed.), ‘Sport, Health and the Body in the History of Education’. Special Issue *History of Education* 41, no. 6 (2012): 709-822, esp. 714-25; Ibid., *Sport, Health and the Body in the History of Education* (London: Routledge, 2015), esp. 10-21.^[1]^[SEP] This also goes for recent work on health and mass schooling and various topics related to bodies, senses, emotions: Helen Proctor and Kellie Burns (eds.) ‘Mass Schooling and Public Health’, Special Issue *History of Education Review* 46, 2 (2017): 118-234.

²⁹ Among such studies touching on educationalisation, medicalisation and psychiatrisation are: Bruno Vanobbergen, “‘Soon He Will Boil over like a Kettle’: Visualizing the Invisible – The Representation of Hyperactivity in Women’s Magazines and Professional Journals for Teachers in Flanders (1965-2005)”, *History of Education* 36, no. 2 (2007): 173-189; Nelleke Bakker, ‘Before Ritalin: Children and Neurasthenia in the Netherlands’, *Paedagogica Historica* 46, no. 3 (2010): 383-410; Christopher Bischof, ‘A “Rich Crop of Nervousness”: Childhood, Expertise, and the State in the mid-1880s British Over-Pressure Controversy.’ *The English Historical Review* 131, no. 553 (2016), 1415-44. Bakker and Vanobbergen have treated TB explicitly in other publications.

³⁰ Jules Amar, *Le moteur humain et les bases scientifiques du travail professionnel* (Paris: Dunod, 1923).

Articulations as re-turnings: tracing matters of body_minds

Hypotheses and theoretical-methodological approach

Given the attention paid to physical and mental exhaustion, wasting, even degeneration, and thus to the strengthening of bodies and minds, not only in the IEM but also in related health education institutes, a first hypothesis adopted here is that, across such contexts, matters of energy/fatigue and ill-/health cannot be disentangled. Although the IEM gave the impression of operating in sterile conditions, we assume TB nonetheless affected its practice and that this shows from similar articulations around inoculation/contagion and energy/fatigue entangled across this vocational institute and health education institutes proper. We further assume that such entangled articulations can best be traced by analysing sources from across associated contexts *through* each other and, finally, that such entanglements are indicative of particular fusions of bodies and minds.

Our framing of these hypotheses draws on theoretical and methodological approaches developed by Tim Ingold and Karen Barad and informed to some extent by Bruno Latour and Elizabeth Grosz and, especially for what visual materials concerns, Elizabeth Edwards. When referring to matters of health, ill-health (here: infection by TB), energy, and fatigue as being entangled, then, we understand these with Barad to ‘lack (...) independent, self-contained existence’.³¹ At the same time, with Ingold we take a multitude of such entanglements to constitute a ‘meshwork of interwoven lines of growth and movement’.³² Entanglements, then, are about “messy”, on-going processes of ‘differential becoming’³³ belonging to a meshwork

³¹ Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), ix.

³² Tim Ingold, “Bringing Things to Life: Creative Entanglements in a World of Materials,” (2010), (http://eprints.ncrm.ac.uk/1306/1/0510_creative_entanglements.pdf, accessed 06 June 2018), 3. See also *Ibid.*, *Being Alive: Essays on Movement, Knowledge and Description* (Oxon: Routledge, 2011).

³³ Barad, *Meeting the Universe Halfway*, 170.

as a an ‘ever-ramifying web’³⁴ or a ‘texture’ gathering things, people and places as enmeshed ‘threads’.³⁵ From this meshwork, we believe, emerge ‘articulations’ or ‘associations in movement’.³⁶ Key to such articulations, which bring to bear ‘sedimented’ entanglements, some of which regard TB and energy/fatigue, are ‘re-turning’-s or ‘ongoing reiterations’: instances of ‘turning (...) over and over again’³⁷ implicating those discerning them. In this sense, then, articulations discerned *are* re-turnings.

Within such a relational approach the IEM and affiliated institutes can be understood to have ‘gathered threads’, some ‘trailing ends’³⁸ of which remain hidden at first sight. The latter, we propose, when concerning articulations around ill-/health and energy/fatigue as matters of body and mind, may call for new con/figurations of bodies and minds. Grosz’s feminist work informs our conception of these not in binary terms, ‘as two distinct substances or two kinds of attributes of a single substance but somewhere in between these two alternatives’; as she has contended, this allows one to conceive of ‘forms of inflection of mind into body and body into mind’ or fusions ‘through a kind of twisting or inversion’.³⁹ With Grosz, we view bodies and minds thus entangled (hence: “body_minds”) as ‘series of open-ended systems’.⁴⁰

³⁴ Ingold, “Bringing Things to Life, 11,12.

³⁵ Ibid., *Being Alive*, xii, 63, 70, 85.

³⁶ On tracing associations in movement for reassembling the social, see Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press, 2005), esp. 1-17. On articulators, see Ibid., 193-195; on articulations see Ibid. ‘How to Talk about the Body? The Normative Dimension of Science Studies’, *Body & Society* 10, no. 2-3 (2004): 205-29.

³⁷ Sedimenting, for Barad, is open-ended. Barad, ‘Diffracting Diffraction: Cutting Together-Apart’ *parallax* 20, no. 3 (2014): 168, 176, 183, esp. 168. She elaborates on the implication of researchers’ “apparatuses of bodily production” in *Meeting the Universe Halfway*.

³⁸ Tim Ingold, *Lines: A Brief History* (London and New York: Routledge, 2007), 169. See also Ibid, Ibid., *The Life of Lines* (London: Routledge, 2015); Geert Thyssen, “Boundlessly Entangled: Non-/Human Performances of Education for Health through Open-Air Schools,” *Paedagogica Historica*, <https://www.tandfonline.com/doi/full/10.1080/00309230.2018.1472617> (Accessed 11 June 2018).

³⁹ Elizabeth Grosz, *Volatile Bodies: Towards a Corporeal Feminism* (Indianapolis: Indiana University Press, 1994), xii.

⁴⁰ Ibid., *The Nick of Time: Politics, Evolution and the Untimely* (Durham: Duke University Press, 2004), 3.

Methodologically, a “diffractive” analysis seemed to us most appropriate to trace articulations around ill-/health and energy/fatigue as matters of body_minds. Such analysis draws on Barad’s feminist physics-inspired method of “diffraction” that involves analysing phenomena through one another, thereby ‘attending to entanglements (...) in ways that help illuminate differences as they emerge’.⁴¹ Based, moreover, on innovative visual histories of education and related methods developed to analyse silences through images by attuning to contexts of production, circulation and consumption,⁴² we opt for a diffractive analysis of a visual nature especially. The latter is consistent with an approach developed by Edwards in visual studies in anthropology, which increasingly informs history of education scholarship. This approach shifts attention away from surface “representations” of images, to be subjected to ‘forensic and semiotic analysis of content’,⁴³ towards complex “enactments” of visual materials, worth analysing as entangled “performances”.⁴⁴

Moving film stills and other visual-textual materials

For our analysis we utilise in particular six stills from an ARBED promotional film called *Columeta: Vu Feier an Eisen/De fer et de feu* (Of Fire and Iron), which should be viewed through ARBED’s brochure *Œuvres sociales* (Social Welfare Provisions), likewise from the

⁴¹ Barad, *Meeting the Universe Halfway*, 30.

⁴² Ian Grosvenor, Martin Lawn and Kate Rousmaniere (eds.), *Silences & Images: The Social History of the Classroom* (New York: Peter Lang, 1999).

⁴³ Elizabeth Edwards, “Photography and the Material Performance of the Past”, *History and Theory* 48, no. 4 (2009): 130.

⁴⁴ Ibid., “Objects of Affect: Photography Beyond the Image”, *Annual Review of Anthropology* 41 (2012): 221-34; Edwards, “Photography,” 130. For similar “diffractive” readings of Barad through Edwards, see: Thyssen, “Boundlessly Entangled”; Joyce Goodman, “Circulating Objects and (Vernacular) Cosmopolitan Subjectivities”, *Bildungsgeschichte: International Journal for the Historiography of Education* 7, no. 1 (2017): 115-26; Ibid., “Thinking through Sonorities in Histories of Schooling,” *Bildungsgeschichte: International Journal for the Historiography of Education* 7, no. 2 (2017): 277-88.

early 1920s.⁴⁵ Both corporate propaganda media ‘went beyond the traditional sales catalogues or banal illustrated brochures’⁴⁶ and, whilst popularising new and healthy lifestyles, served to attract workers as well as international clients. They were produced to showcase ARBED’s economic leadership and social and political impact but, foremost, to help sell its products.⁴⁷ Both media can be seen to gather and engage with knowledge from across disciplines and concerns around infection, energy and rationalisation, thus contributing to already on-going ‘institutional cross-fertilization’.⁴⁸ There are differences worth noting between both media, one key difference being that *Columeta* constituted a *moving* performance. Indeed, the stills we have chosen to analyse from it arrest the very flow of movement from which *Columeta* gained meaning across specific contexts of production, circulation and reception.⁴⁹ That said, the following provides some details about the propaganda film itself.

Columeta was mainly dedicated to ARBED’s “modern” steel factories and production processes, yet at the end the film also contains a short section on some of the steel concern’s social welfare provisions.⁵⁰ The IEM – specifically its then deemed innovative infrastructure, psychophysiological laboratory, gym, swimming pool, boy scouts troop and school harmony – is featured in the final sequence, immediately preceded by the Kreuzberg preventorium-sanatorium, the Dudelange open-air school, the workers’ wholesale shops, and workers’

⁴⁵ *Vu Feier an Eisen/de fer et de feu: La sidérurgie au Luxembourg au début des années vingt*. Directed by Gustave Labruyère/Re-edited by the Centre National de l’Audiovisuel (CNA). Luxembourg: CNA, 1921-22/1997; ARBED, *Œuvres sociales* (Luxembourg: Bück, 1922).

⁴⁶ Charles Barthel, ‘COLUMETA (Vu Feier an Eisen): L’aventure du premier film publicitaire de l’Arbed’ [COLUMETA (Of Fire and Iron): The Adventure of ARBED’s First Advertising Film], *Hemecht* 50, no. 2 (1998): 177-206: 181.

⁴⁷ Ira Plein, ‘Beautiful Luxembourg, Steel Works, and a Swimming Pool: The Corporate Film *Columeta* and the Formation of a Corporate, and National, Image’, in *Films that Work Harder: The Global Circulations of Industrial Cinema*, ed. Vinzenz Hediger, Florian Hoof, and Yvonne Zimmermann (Amsterdam: Amsterdam University Press, forthcoming).

⁴⁸ Tumblety, *Remaking the Male Body*, 62.

⁴⁹ Paul Warmington, Angelo Van Gorp and Ian Grosvenor, “Education in Motion: Uses of Documentary Film in Educational Research”, *History of Education* 47, no. 4 (2001): 457-472.

⁵⁰ Geert Thyssen and Klaus Dittrich, ‘Water and Dust: Recovering Washed-Out Past of Industry in Luxembourg’, in *Education across Europe: A Visual Conversation*, eds. Catherine Burke, et al. (EERA, Network 17 - Histories of Education, 2014), 263-66; Plein, ‘Beautiful Luxembourg’.

quarters. In this way the IEM is visually separated from the first two types of social welfare provision, primarily framed as health initiatives, by consumer and housing provisions. Also in ARBED's propaganda brochure *Œuvres sociales* the IEM and health institutes proper are presented as model institutes.⁵¹ After giving an overview of initiatives in the areas of social rights, education and health, the brochure describes in greater detail then recently established institutes in separate chapters.⁵² Both the brochure's and the film's sections on social welfare provisions conclude with the IEM and pay more attention to it, as if ARBED wanted to conclude with an image of a "utopian body",⁵³ a body well-educated and -trained, healthy, speedy, strong and energetic which would command the mechanised world, adjusted to its rhythm rather than succumbing to sickness or weakness. Moreover, text used in both media stressed the various aims of institutes covered, thus enlarging differences between these, albeit within similar efficiency and profitability discourse. Social, health, and education initiatives were thus both separated and (seemingly purposely) enmeshed.

We cannot further contextualise all textual and visual materials diffractively analysed here through stills selected from *Columeta*. Suffice it to say that among these are 2,248 IEM-related glass plate negatives restored by the Luxembourg Centre National de l'Audiovisuel (CNA), a large photo collection from the Dudelange City Archives and other sources relating to the health education institutes mentioned, and a sizeable sample of contemporary writings on TB including numerous press articles accessed via the online platform Eluxemburgensia.

The IEM and health education institutes diffractively analysed

⁵¹ ARBED, *Œuvres sociales*, 1-67.

⁵² Ibid., 15-22; 23-37; 39-67.

⁵³ Michel Foucault, 'Utopian Body', in *Sensorium: Embodied Experience, Technology, and Contemporary Art*, ed. Caroline A. Jones (MIT Press: Cambridge, MA, 2006): 229-34.

In what follows, we expose similar articulations around energy/fatigue and infectious disease from across contexts relating to the IEM-and health education institutes connected to it. These articulations make themselves felt in particular through visual-textual performances invoking the human motor's "condition" (e.g. "constitution", "resistance", "endurance") in relation to cleanliness, purity, adaptation capacity, rhythm, harmony, balance, etc.⁵⁴ Attention paid to such matters by both kinds of institutes mentioned reveals a shared psycho-physiological culture. First, we describe the features of this culture as regards the IEM, to reveal "absences" and "semi-presences" of TB and energy/fatigue in this context. Next, we analyse stills selected featuring gymnastics, swimming and eating/cooking, which point to articulations around ill-/health and energy/fatigue in relation to water and air, and nutrition, respectively.

"Absences" and "semi-presences" of TB in the IEM

Ill-health, particularly TB infection, was not immediately visible within the IEM, due to its self-positioning as a high-level scientific, sterile professional laboratory. Exhausted or sickly bodies are absent from the institute's self-representations, as if its pupils remained untouched by disease and it "produced" only healthy, strong, dynamic, energetic and concentrated future workforce members. That the healthy feature prominently in the IEM, can be explained by its rather strict selection procedure separating the wheat from the chaff: young adolescents with too weak a constitution were not admitted.⁵⁵ Direct references to TB are also hard to find in the IEM's curriculum. TB was assumed to stay outside the institute's walls even if it devoted 'extraordinary attention' to gymnastics, swimming and general and work hygiene.⁵⁶ Only occasionally, this deafening silence was broken when, in brochures and annual programmes,

⁵⁴ Amar, *Le moteur humain*, 147-9. See also Tumblety, *Remaking the Male Body*, 47.

⁵⁵ Aloyse Robert, 'La méthode psycho-physiologique du travail et l'orientation professionnelle', in *Programme publié à la clôture de l'année scolaire 1919-1920*, ed. IEM (Luxembourg: Beffort, 1920), 53-71: 57.

⁵⁶ ARBED, *Œuvres sociales*, 49-50.

reference was made more generically to weekly lessons on hygiene, the conditions of human life (air, water, food, clothing, housing, work and rest), and illnesses including infectious diseases.⁵⁷

One may further assume that those featuring in visual images relating to the IEM were carefully selected and staged to create the impression of an institute unpolluted by infectious disease. One example, nonetheless hinting indirectly at TB, is found in the image of a notice board on the wall of a workshop cautioning against spitting,⁵⁸ desiccated sputum having long been considered a major cause of TB infection.⁵⁹ Almost invisible in between other images of notice boards addressing safety on the work floor, body posture, work rhythm and handling of tools, it suggests the institute was wary of TB. The disease, although regressing – having temporarily flared up after the First World War – was still ubiquitous at the time.⁶⁰ Direct connections, between energy management, overwork etc. and TB were occasionally made explicit in Luxembourg writings more generally.⁶¹ Yet, there remained a stigma around TB, which one regretted to note prevented the disease from being duly reported as per the decree of 29 April 1924, perhaps at times, one suggested, out of forgetfulness.⁶² This stigma may further explain the scarce explicit manifestations of TB in IEM-related sources.

⁵⁷ Ibid., 51; IEM (ed.), *Programme publié à la clôture de l'année scolaire 1918-1919* (Luxembourg: Linden & Hansen, 1919), 70.

⁵⁸ Unarchived glass plate from the *HISACS Institut Emile Metz*-file, CNA (Dudelange, Luxembourg)

⁵⁹ Martin Klein, *Mondorf-les-Bains* (Luxembourg: Beffort, 1888), 124.

⁶⁰ May Schoué, *Eine volkstümliche gemeinverständliche Belehrung über die Tuberkulose als Volkskrankheit und deren Bekämpfung in Luxemburg* (Bonn: Rhenania, 1916); Mayrisch, *Rapport sur l'état actuel de la question de la tuberculose*.

⁶¹ Antonin Baratier, 'La tuberculose au village', *L'Indépendance Luxembourgeoise*, 4 April 1908, 1.

⁶² Jean-J. Lentz, 'La lutte contre la tuberculose dans le Grand-Duché de Luxembourg - IX - Chapitre III: La législation sociale depuis la Guerre Mondiale', *L'Indépendance Luxembourgeoise*, 15 January 1934, 3. On the matter, which struck a particularly sensitive cord, see, Docteur Toulouse, 'Doit-on déclarer la tuberculose?', *L'Indépendance Luxembourgeoise*, 6 December 1911, 1; 'La situation sanitaire dans le Grand-Duché de Luxembourg', *L'Indépendance Luxembourgeoise*, 29 November 1929, 1.

Sources mentioning lectures on the “trio of social plagues” (i.e., alcoholism, TB and venereal diseases) being held at the IEM by the League for Social and School Hygiene for a broader audience,⁶³ nevertheless suggest that TB was not entirely absent from the institute. But still more realistic than occasional lectures about infection doctrine were the exposure to psychophysiological testing and training, weekly gymnastics classes, biweekly sessions in the school’s swimming pool, and open-air activities in the context of a scout division connected to the school, all intended to help imprint notions of hygiene, regularity, and discipline. What was good for “(pre)tubercular” children surely could not harm robust adolescents.

TB emerges clearly from the IEM’s culture in which the psycho-physiological took primacy as the key to the soul and body of the worker’s child. This culture is evident, for instance, in the institute’s “clinical” focus on bodies and minds through “new” psychometric methods introduced shortly after the its creation.⁶⁴ In 1919 a psychophysiological laboratory was indeed annexed to the school for this purpose, which took form based on instructions from Amar. In this laboratory, students were subjected to a comprehensive set of testing and training apparatus that, based on physiological and psychological measurements, helped compile data about the human motor.⁶⁵ The laboratory had to allow for the refinement of this organic machine’s capacity to adapt to different work conditions with a view to the most hygienic and economic execution of work.⁶⁶ In its “experimental-clinical” approach to test subjects, the IEM’s laboratory thus hardly differed from the clinical assessment facilities of dispensaries, preventoria-sanatoria and open-air schools where medical-pedagogical screening of children

⁶³ IEM (ed.), *Programme publié à la clôture de l’année scolaire 1916-1917* (Luxembourg: Bück, 1917), 95. See also, IEM, *Stenographischer Bericht der Versammlung vom Dienstag den 17. Juni 1913* (Dommeldange: Nicolay, 1913), 4; Robert, ‘La méthode psycho-physiologique’, 70-1.

⁶⁴ Herman, ‘Forging Harmony,’ 592-614.

⁶⁵ Jules Amar, *The Human Motor or the Scientific Foundations of Labour and Industry* (London: Routledge, 1920); Rabinbach, *Human Motor*.

⁶⁶ S.n., ‘Discours prononcé par le directeur J.P. Arend à la distribution des prix du 4 septembre 1919’, in *Programme publié à la clôture de l’année scolaire 1918-1919*, 79-83: 82; ARBED, *Œuvres sociales*, 47.

took place. In Luxembourg, features like body weight, grip strength, intellectual and sensorial aptitudes, chest circumference upon inhaling and exhaling, lung content and the like were measured in both types of laboratories.⁶⁷

Indeed, both through the IEM and affiliated health education institutes one actively tinkered with the human “motor” and the social “engine”.⁶⁸ This multi-scalar body_machine, one believed, ‘could be repaired, perfected, energized, and harmonized’,⁶⁹ which was key, as intrinsic to imaginaries of the human and social motor was the notion that ‘machine bodies experience fatigue, wear out’.⁷⁰ In both kinds of institutes, statistics was furthermore used as a diagnostic instrument. However differently the institutes were profiled, precise analysis and registration of psycho-physiological constitution were weighed against the interest of potential labour productivity. Similarly, in sanatoria for adults, therapeutic success was measured in function of the produced number of those fit for work versus the chronically ill and death.⁷¹

Air, water, and food: Articulations involving the sensorium

The film stills analysed here confirm the presence of similar articulations around ill-/health and energy/fatigue. The flowing sequence in which they interweave hygienic activities hints at these associations’ inextricable entanglement across institutes usually profiled differently from

⁶⁷ Nicolas Braunshausen, ‘Psychologische Personalbogen als Hilfsmittel der Pädagogik und der Berufsberatung’, in *Programme publié à la clôture de l’année scolaire 1917-1918*, ed. IEM (Luxembourg: Soupert, 1918), 19-51: 22-3; Ewert and Urbany, *Die Waldschule der Stadt Düdelingen*, 18.

⁶⁸ Herman, Priem, and Thyssen, ‘Body_Machine’.

⁶⁹ Alan Hyde, *Bodies of Law* (Princeton, NJ: Princeton University Press, 1997), 34; Pieter Verstraete and Frederik Herman, ‘Un alegato a favor de lo compartido: Historia de la discapacidad, discursos de rehabilitación, y el individuo’/‘A Plea for Commonality: Disability History, Discourses of Rehabilitation, and the Individual’, *Revista de Historia de la Medicina y de la Ciencia* 68, no. 2 (2016): 147-61.

⁷⁰ Hyde, *Bodies of Law*, 34. See also De Bont, ‘Energie op de weegschaal’; Rabinbach, *Human Motor*.

⁷¹ See, e.g., Ligue Nationale Luxembourgeoise contre la Tuberculose, *Rapport moral, médical et financier sur l’exercice 1912* (Luxembourg: Huss, 1912).

each other. Precisely because the film stills selected blend together, in what follows we analyse them through each other.

The stills selected freeze children and young adults in motion in health institutes and the IEM and re/configure how they move – individually or in group – in free and playful or rhythmic and orchestrated ways. Movement of the human motor, as an effect of the available energy and of therapeutic activity (re)harmonising energy balance, in itself emerges as a main motif here. Physical-mental activity versus passivity, exhaustion or fatigue, put on display the rehabilitative character and trainability/malleability of body and mind.⁷² Further analysis of the stills thereby reveals the centrality of basic elements of human life (air, water, food etc.) reiterated, among other places, in the IEM school programme of 1918-1919.⁷³ The praxis and knowledge given shape around such elements accessed through sense organs like the skin can be seen to have mediated children's and adolescents' sensorium,⁷⁴ and in Grosz's terms given way to inflections of body into mind and vice versa.

The two first stills (fig. 1, 2) give prominence to rhythmic and respiratory gymnastics involving mentalisation of bodily movement and embodiment of rhythm modelled. This constituted body_mind-training in both kinds of institutes, if in varying ways and to different effects. Such training was key in view of new links imagined between rhythm, harmony, and emotions like happiness.⁷⁵ The IEM primarily strove to generate "body memory" in students with a view to strength and dexterity and the like; in multimodal and multisensory ways it thus

⁷² ARBED, *Œuvres sociales*, 20-1.

⁷³ Ibid., 51; IEM (ed.), *Programme publié à la clôture de l'année scolaire 1918-1919* (Luxembourg: Imprimerie Universelle Linden & Hansen, 1919), 70.

⁷⁴ Cf. Caroline A. Jones, 'The Mediated Sensorium', in *Sensorium*, 5-49.

⁷⁵ Richard Sennett, *The Craftsman* (London: Allen Lane, 2008), 201-39. See also, William M. Reddy, *The Navigation of Feeling: A Framework for the History of Emotions* (Cambridge: Cambridge University Press, 2001).

sought to equip boys and young men with truly “knowing bodies”.⁷⁶ Memory and knowledge imagined here differed somewhat from the kind promoted in health education institutes, where visual enactment of (not-yet-)sickness of bodies and minds through regular exposure to sun and air in more advanced states of undress helped con/figure children as TB-threatened and otherwise vulnerable.⁷⁷

Images from both kinds of institutes, rather than just capturing moments in time and reflecting knowledge and praxis circulating in entwined disciplinary fields, *moved* viewers differentially, entangling gendered imaginaries of past peasant ‘virility’ and ‘freshness’ of the ‘race’,⁷⁸ respectively, amidst fears of degeneration. They helped re-work conceptions of the interrelations of mechanisation and harmonious development,⁷⁹ heredity and infection,⁸⁰ and resistance against illness through restoration. Viewed thus, through other visual materials,⁸¹ the film stills stress the need of inoculating bodies, minds and souls. Gymnastics, holiday camps etc. are thereby viewed as relating to, but surpassing, anti-TB action proper.⁸²

⁷⁶ Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (Chichester: John Wiley & Sons, 2007), 45, 66. For more on embodied learning and enculturation, see Karin Priem and Frederik Herman, ‘Hautnah: Materialität der Moderne und sensomotorische Ansätze der Berufsbildung im “Zeitalter des Stahles”’, in *Die Sache(n) der Bildung*, ed. Christiane Thompson, Rita Casale and Norbert Ricken (Paderborn: Ferdinand Schöningh, 2017), 213-239; Geert Thyssen and Ian Grosvenor, eds. ‘Learning to Make Sense: Interdisciplinary Perspectives on Sensory Education and Embodied Enculturation’, special issue *The Senses and Society* 14, no. 2 (forthcoming July 2019).

⁷⁷ Teemu Ryymin, “‘Tuberculosis-Threatened Children’: The Rise and Fall of a Medical Concept in Norway, c. 1900-1960,” *Medical History* 52, no. 3 (2008): 347-364.

⁷⁸ Baratier, ‘La tuberculose au village’, 1.

⁷⁹ ‘Industrie et pédagogie ou l’enseignement technique à l’Institut Émile Metz’, *L’Indépendance Luxembourgeoise*, 3 November 1923, 2.

⁸⁰ Docteur Burnet. ‘La Tuberculose - maladie de l’enfance: Préservation et vaccination’, *L’Indépendance Luxembourgeoise*, 27 December 1911, 1; ‘Rapport général du Collège Médical’, *L’Indépendance luxembourgeoise*, 4 December 1930, 3; Léandre Spartz, ‘Chronique scientifique: Les voies de pénétration du virus tuberculeux’, *Luxembourg*, 20 April 1935, 6; Robert Debré, ‘On peut prévenir la tuberculose’, *Luxembourg*, 9 July 1937, 1; Léandre Spartz, ‘La question de l’hérédité de la tuberculose’, *Luxembourg*, 20 September 1938, 1.

⁸¹ Edwards, ‘Photography and the Material Performance of the Past’.

⁸² As mentioned in ‘La lutte contre la tuberculose dans le Grand-Duché de Luxembourg - XXI’, *L’Indépendance Luxembourgeoise*, 28 February 1934, 1.

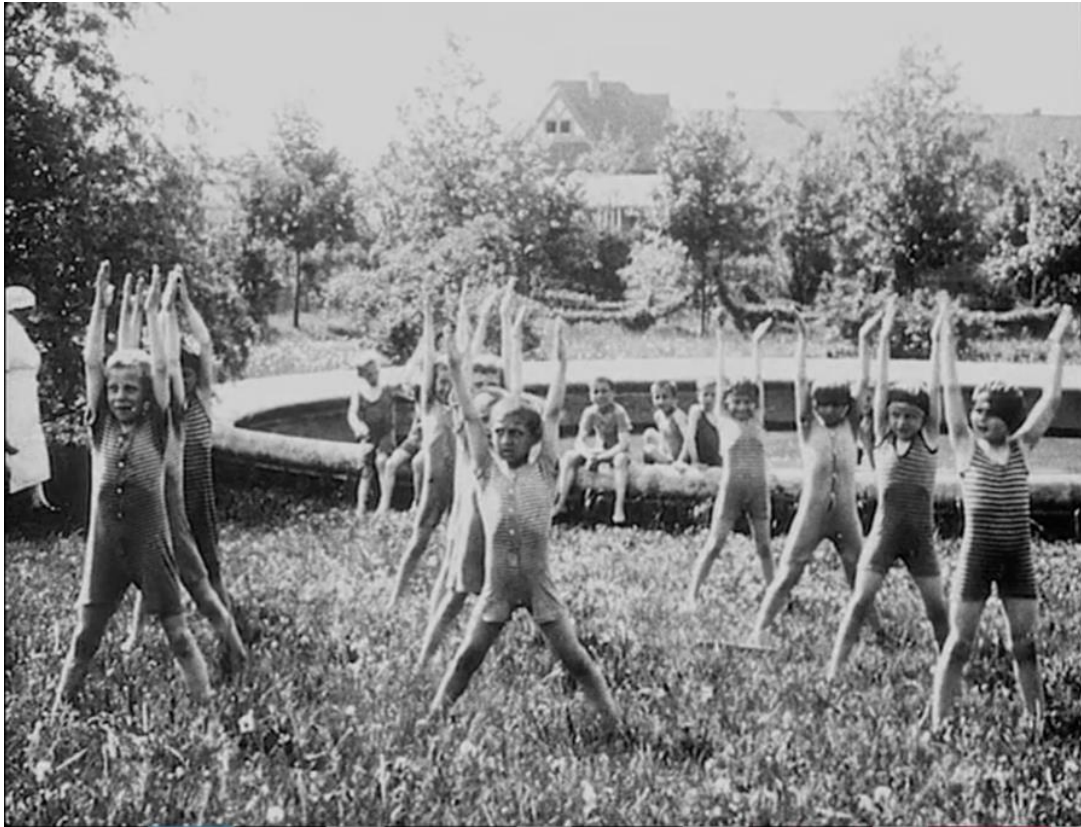


Fig. 1. Sanatorium des enfants - Usine de Dudelange. Frame from *Vu Feuer an Eisen* (reconstructed 1997 version of *Columeta*, 1921/22), courtesy of CNA, Luxembourg. (1:08:45)



Fig. 2. Institut Émile Metz. Frame from *Vu Feuer an Eisen* (reconstructed 1997 version of *Columeta*, 1921/22), courtesy of CNA, Luxembourg. (1:15:02)

Two further stills (fig. 5, 6) stress the importance attached to respiration and the “open air” – a central motif internationally by the early twentieth century amidst advanced industrial mechanisation (cf. *Lebensreform* and *Freikörperkultur* in Prussia and *naturisme* in France). The film stills, then, performing “invented traditions” around healthy outdoor agrarian life, need to be viewed as engaging with counter-images of polluted air in mines, factories and cities, and with residue of theory about supposed ‘miasmas [and] infected mephitic air of lower classes’.⁸³ Earlier seen as harmless and thus rendered invisible, air became a matter to be checked and managed by laboratory science.⁸⁴ Various scientific devices indeed made air more visible than ever before.⁸⁵ Spirometers and pneumographs used across institutes studied here to measure lung capacity, breathing rate, etc. thus captured and displayed expired air. Air, then, here figured differentially as contaminator, inoculator and conductor to combustion (energy production) in human machines: an aid in the strengthening and training of the future workforce.⁸⁶ Nurse(-like) uniforms versus regular clothes worn by adults in turn helped frame bodies and minds thus differentially re/configured. Yet, even in the IEM, cleanliness, purity, revitalisation and preservation as keystones of the new cult of hygiene justified scrutinising both the “condition” and (presumed) “constitution” of the young human machine, as much so as did work rationalisation theory.⁸⁷

⁸³ Bruno Latour, ‘Air’, in *Sensorium*, 105-107: 105.

⁸⁴ *Ibid.*, 106.

⁸⁵ Frederik Herman and Karin Priem, ‘The Eye of the Machine: Labour Sciences and the Mechanical Registration of the Human Body’, in *Fabricating Modern Societies*, 138-164.

⁸⁶ Jules Amar, *Le rendement de la machine humaine* (Paris: Baillière, 1909), 82.

⁸⁷ IEM, *Stenographischer Bericht*, 5.



Fig. 3. Sanatorium des enfants - Usine de Dudelange. Frame from *Vu Feier an Eisen* (reconstructed 1997 version of *Columeta*, 1921/22), courtesy of CNA, Luxembourg. (1:09:10)



Fig. 4. *Institut Émile Metz*. Frame from *Vu Feier an Eisen* (reconstructed 1997 version of *Columeta*, 1921/22), courtesy of CNA, Luxembourg. (1:15:43)

Similarly, film stills (fig. 3, 4) giving centre stage to water used for modern bathing installations, swimming pools, and hydrotherapy apparatus subtly entangle imaginaries of the body-motor, nature-machinery,⁸⁸ and water-fuel, (re)configuring articulations around health and energy. Performing happiness, exercise, relaxation, harmony, balance, purity etc., they presented antidotes to disharmony, imbalance, impurity, or: illness and fatigue.⁸⁹ These visual materials acquire meaning through others featuring scenes at rivers on the countryside or the Belgian coast and “state-of-the-art” bathing tubs offering sickly children assumed benefits of carbonic acid gas- and Bad Kreuznach salt-enriched water.⁹⁰

Performances of enlightened knowledge and praxis around sanitary equipment here served, among other things, to counter fears of invisible germs potentially infecting both the physical and the social motor – fears literally articulated in the frame of the IEM.⁹¹ Water and warm humidity in turn were no longer readily associated with disease but, like the open air and sunlight, deemed a means to reduce risk of infection by TB bacilli, then still considered more contagious in pulverulent form.⁹² Likewise, washing and swimming were increasingly viewed – and here presented – as key exercises to develop bodies’ musculature and to restore both physical and mental energy balance. Cleanliness and maintenance of human machines prevented infection and wasting away of bodies and minds. Such articulations saw hygiene and thermodynamics converge in Luxembourg, as elsewhere,⁹³ justifying the re/configuring of bodies and minds as body_minds variously amenable to immunisation and reinvigoration.

⁸⁸ Thyssen and Dittrich, ‘Water and Dust’, 263-6.

⁸⁹ Herman, Priem, and Thyssen, ‘Body_Machine’.

⁹⁰ Ewert and Urbany, *Die Waldschule der Stadt Düdelingen*, 6-8, 19.

⁹¹ Alfons Labisch, ‘Sozialhygiene’, 262.

⁹² Marcelin, ‘La tuberculose’, 1.

⁹³ See, for instance, for France: Hyde, *Bodies of Law*, 254.



Fig. 5. L'école en forêt de Dudelange. Frame from *Vu Feier an Eisen* (reconstructed 1997 version of *Columeta*, 1921/22), courtesy of CNA, Luxembourg. (1:11:13)



Fig. 6. Institut Émile Metz. Frame from *Vu Feier an Eisen* (reconstructed 1997 version of *Columeta*, 1921/22), courtesy of CNA, Luxembourg. (1:17:37)

The last film stills selected (fig. 5, 6) belong to the context of the Dudelange open-air school and of holiday camps connected to the IEM-affiliated boy scouts troop. They present another key theme around which associations regarding health/infection and energy/fatigue as body_mind matters densify across source materials, namely: nutrition. That food and drink constituted combustion fuel for the human engine's body and mind of was evident for those concerned with the institutes studied here.⁹⁴ Yet nutrition could lead to health or illness and, likewise, nourish or infect the soul. Alcohol, dairy, and meat and animal by-products here had particular significance. ARBED's wholesale shops in Dudelange (as of 1893) and Esch-sur-Alzette (1915) and its own farms (as of 1916),⁹⁵ gave workers, employees and their families access to more affordable higher quality foodstuffs than those available on the private market. This was of course not only 'in the interest to cooperate in the joint enterprise of developing fully adequate people, able to use their powers in full material and spiritual equality,'⁹⁶ but also out of fear of the "germ of socialism" and weakness of the labour force.

With regard to weakness and strength or fatigue/infection and energy/health, scientific knowledge was quite clearly still in the making. Various competing theories circulated about food and drink and the potential nutritional or caloric value and proneness to contamination of nutrients, depending on the context. Thus, economic circumstances and cultural traditions affected what qualified as food adulteration.⁹⁷ In relation to TB, dairy and bovine meat were regarded with particular suspicion in the light of emerging bacteriological findings, although food rich in milk and fat, particularly animal fat, were also seen to strengthen the organism.⁹⁸

⁹⁴ Amar, *Le rendement de la machine humaine*.

⁹⁵ ARBED, *Œuvres sociales*, 8, 11.

⁹⁶ Émile Mayrisch, *Das Düdelinger Economat und seine Berechtigung* (Luxembourg: Schroel, 1906), 14. The translation is the authors'.

⁹⁷ *Mémorial du Grand-Duché de Luxembourg*, 12 May 1923, 94; Heirens, *Die Escher Waldschule*, 15.

⁹⁸ Léandre Spartz, 'La tuberculose et le lait', *L'indépendance Luxembourgeoise*, 25 September 1925, 2.

These and other findings determined what could pass for “abundant” and “rational”⁹⁹ or conversely debilitating nutrition. Thus, in the open-air schools weak ferruginous-arsenical Levico water was given to children every two days and deemed especially suited to the anaemic,¹⁰⁰ and in the IEM and health institutes alike one attempted to nip the germ of alcoholism in the bud by exposing children and young people to “natural” leisure activities, nutrition sources and food preparation practices. Of all scourges alcoholism was considered the worst, as it could cause dormant TB bacilli, found in almost all people, to awaken.¹⁰¹ In short, alcohol could not provide the kind of substance for both body and mind that other nutrients, including coffee,¹⁰² were imagined to offer.

The stills analysed here then enact then-circulating knowledge and praxis around the preparation and serving of milk, soup, etc., with added smoke effects stressing the importance of proper cooking practices, including pasteurisation procedures. They performatively added to the “pasteurisation” of a nation,¹⁰³ that is: the effect and iterative movement of associations around contagion and energy/fatigue. Further entangling such articulations, they contribute(d) to re-turnings of ill-/health and energy/fatigue as body_mind matters. Adaptability, endurance, and capacity for resistance were thereby connected to “neutral” common denominators like constitution and condition, relevant not only for the (not-yet-)sick but for all. Strengthening the body through the mind and vice versa in everyone, one hoped, could avoid blind “socialism” on the part of germs.¹⁰⁴ Just such indiscriminate infection, however, may have befallen even the privileged group of workers’ offspring recruited by the IEM. In the annals of the school from shortly after the First World War, several deaths among former students were listed, of

⁹⁹ ARBED, *Œuvres sociales*, 20-1.

¹⁰⁰ Ewert and Urbany, *Die Waldschule der Stadt Düdelingen*, 19.

¹⁰¹ André Brisson, ‘La campagne antituberculeuse’, *L’Indépendance Luxembourgeoise*, 6 October 1911, 1.

¹⁰² Ewert and Urbany, *Die Waldschule der Stadt Düdelingen*, 15, 49.

¹⁰³ Latour, *Pasteurization*.

¹⁰⁴ Tomes, *Gospel of Germs*, 12, 128, 241.

which some remained unexplained. This silence, most likely due to aforementioned stigma around TB, applied more widely to ‘children supposedly born and raised in healthy families’ of whom ‘a considerable number (...) die’, as a 1929 Luxembourg newspaper bemoaned.¹⁰⁵ It therefore seems plausible that the IEM did not operate completely *in vitro*.

Discussion

Our paper has traced hidden articulations around ill-/health and energy/fatigue across distinct yet connected education contexts as matters pertaining to bodies and minds. We have shown in particular that TB played a significant role even within an institute not primarily focused on health education. Although the IEM may have wanted to convey the impression that it operated *in vitro* within a broader architecture of social welfare provisions, TB still emerges from its conception of interrelations of the human and social organism/machine and of young bodies and minds. This shows from sedimented entanglements concerning health, potential infection by TB, energy, and fatigue, emerging through performances in the form of the film stills analysed, relating to gymnastics, swimming and bathing, and eating and cooking. We have exposed the meshwork accommodating such entangled articulations, revealing a shared psycho-physiological culture embodied and mentalised by children and adolescents through involvement of the sensorium.

We understand the articulations mentioned as re-turnings pointing to similar yet differential forms of imagining of, and acting upon, bodies and minds. The latter, in various ways, seem to fuse together especially when re/configured as relating to body_machines’ condition or constitution. The latter two denominators have allowed the boundaries of thermodynamics, psychotechnics, gymnastics and hygiene, among other disciplinary fields to be crossed. Seemingly absent in an institute like the IEM, TB then emerges from our research

¹⁰⁵ ‘La situation sanitaire dans le Grand-Duché de Luxembourg – II’, *L'Indépendance Luxembourgeoise*, 2 December 1929, 1.

as something that, nevertheless, shaped educational praxis, as in health education contexts, in everything from attention to inoculating natural elements, to reinvigorating movement to which bodies were exposed, to clinical registering, measuring, testing and training of bodily-mental capacities, through to the imprinting of hygiene, regulation and discipline. From the film stills analysed, mediators of the sensorium like air, water and food, alongside movement, as central motifs give insight into how the interrelations of bodies, minds, ill-/health and energy/fatigue were in the process of being articulated.

From the film stills analysed, one catches a glimpse of differential ways that bodies and minds were thought to fuse together in relation to matters of energy/fatigue and ill/health. Silences remain, however, for instance, in terms of explicit hints regarding how such fusions, beyond the adagio of *mens sana in corpore sano*, referred to in both kinds of institutes, were configured. Likewise, questions remain as to whether, and if so, how articulations around TB, energy and fatigue have threaded their way into current educational praxis and continue there to make themselves felt, for example, in attitudes towards, and dealings with, other kinds of ill-health conceived of as bodily and/or mental. In countries like the UK, as elsewhere, there is growing concern with “burn-out” in children of an ever-younger age, perhaps ironically at least partly in response to new kinds of test apparatus devised to assess their “performance”. Might there be hidden in such energy/fatigue-related metaphors residue of infection theories and rationalisation theories, or at least of related re/configurings of bodies and minds? In any case, the conception of body_minds as open-ended systems allows for further re-turnings to emerge and be explored.